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Jones

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[54] **ANTI-SKID DEVICE FOR FLAT-BOTTOMED BOATS**

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[51] **Int. Cl.**[5] **B63B 39/06**

[52] **U.S. Cl.** **114/126**; 114/141; 114/152; 114/63

[58] **Field of Search** ..... 114/121, 126, 127, 128, 114/129, 130, 131, 140, 141, 152, 145 A, 144 R, 274, 278, 63

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,998,791	9/1961	Light	114/66.55
3,093,105	6/1963	Rebikoff	114/126
3,516,100	6/1970	Ellis	114/141
3,982,493	9/1976	Cronin	114/152
4,437,841	3/1984	Stallman	440/42
4,439,166	3/1984	Maxwell	114/141
4,569,302	2/1986	Gruzling	114/129
4,776,294	10/1988	Childs	114/126
4,779,553	10/1988	Wildhaber	114/144 R
4,807,553	2/1989	Brown	114/152
5,127,353	7/1992	Wieser	114/145 A

Primary Examiner—Joseph F. Peters, Jr.
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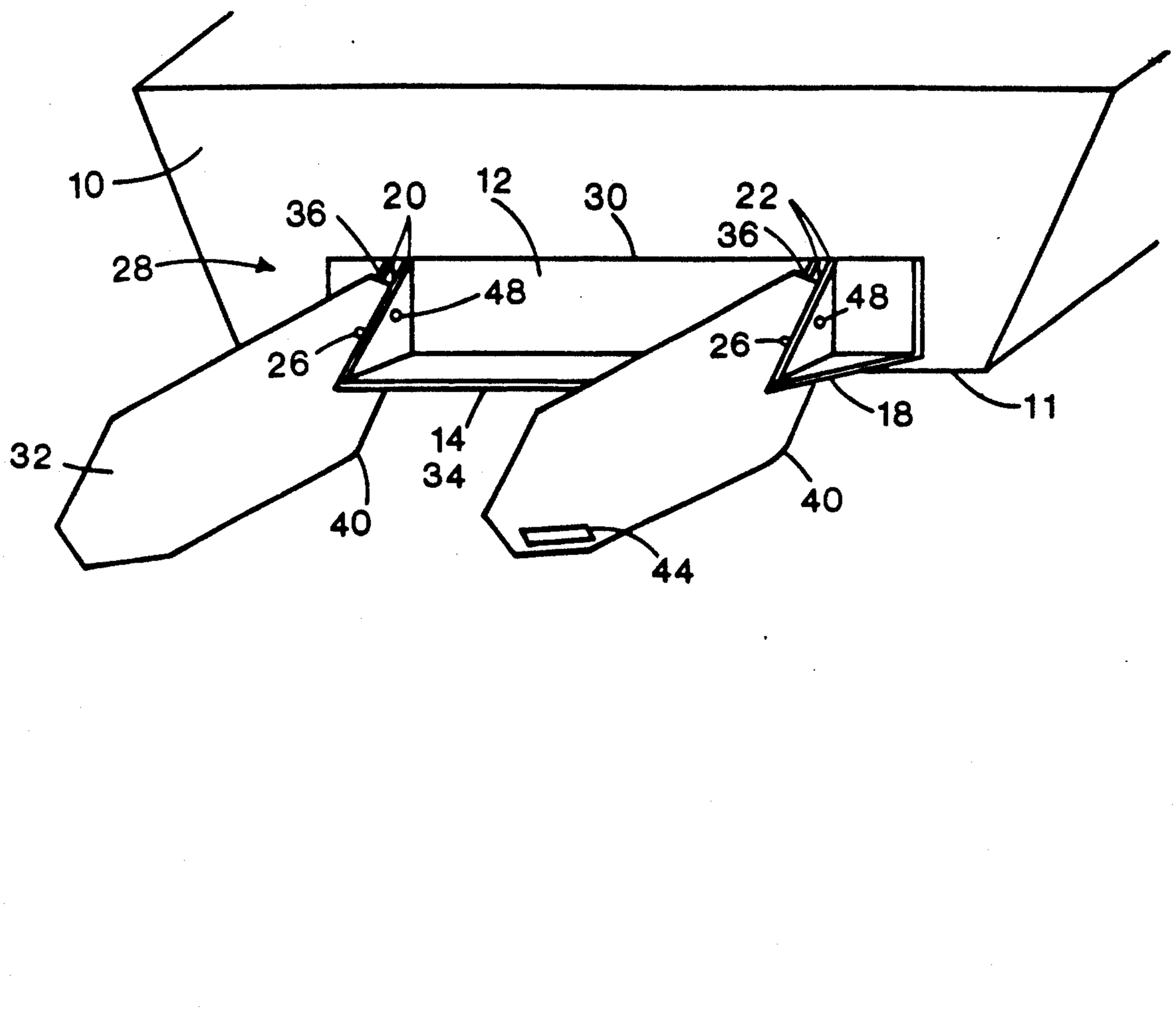
[57] **ABSTRACT**

A pair of pivotally attached fins depend into the water below the hull of the boat. When turning maneuvers are executed the tendency of the boat to skid sideward is resisted by the downwardly engaged fin panels. The device provides improved steering control to all boats so equipped, but especially to outboard jet powered boats traveling in shallow water. When underwater objects or the bottom of a body of water are encountered, the leading edge of the fins strike the object(s), causing the fins to pivot upward to clear the obstacle(s) and then return automatically to the water to provide an extra measure of boating safety.

1 Claim, 1 Drawing Sheet



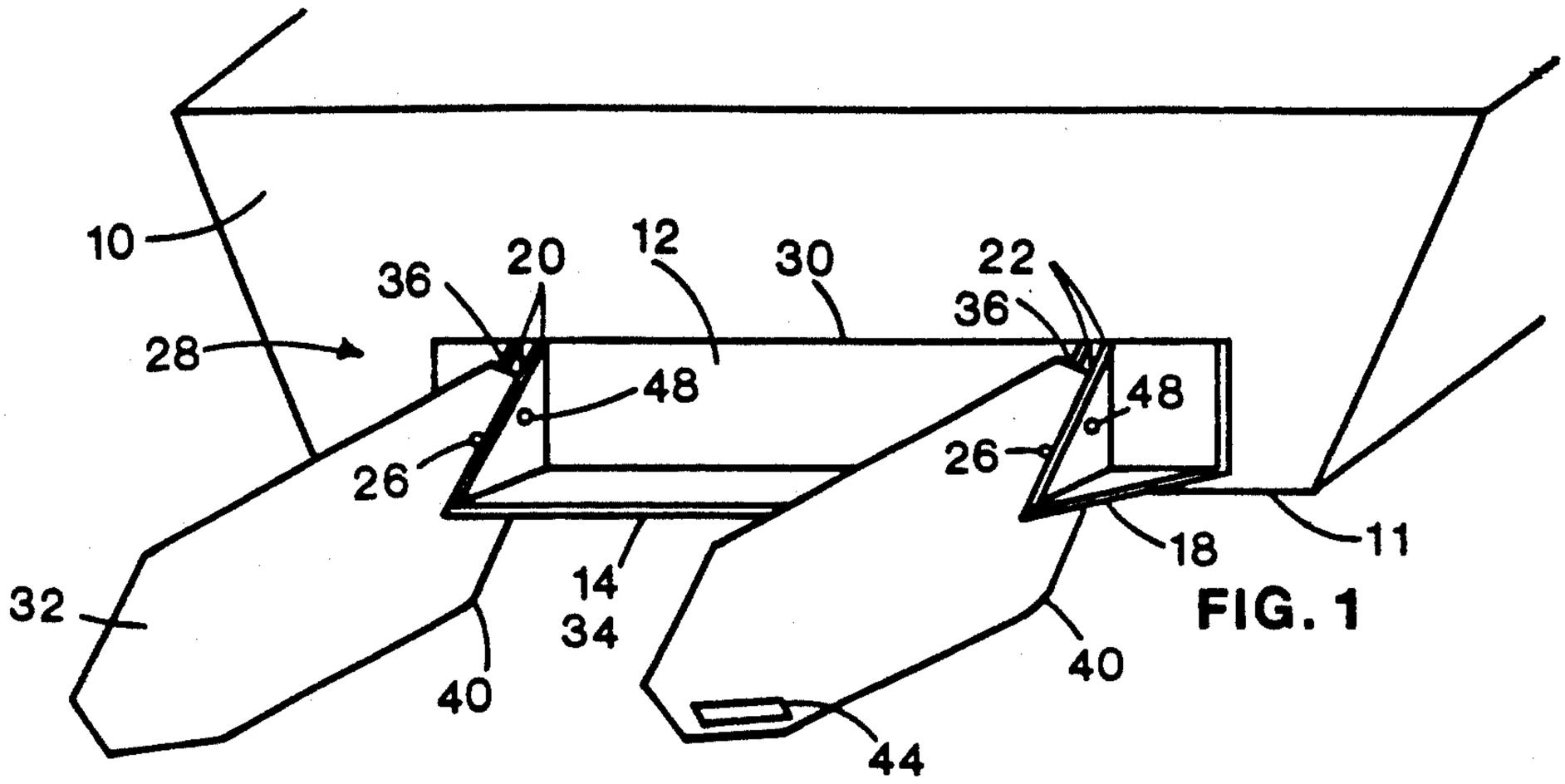


FIG. 1

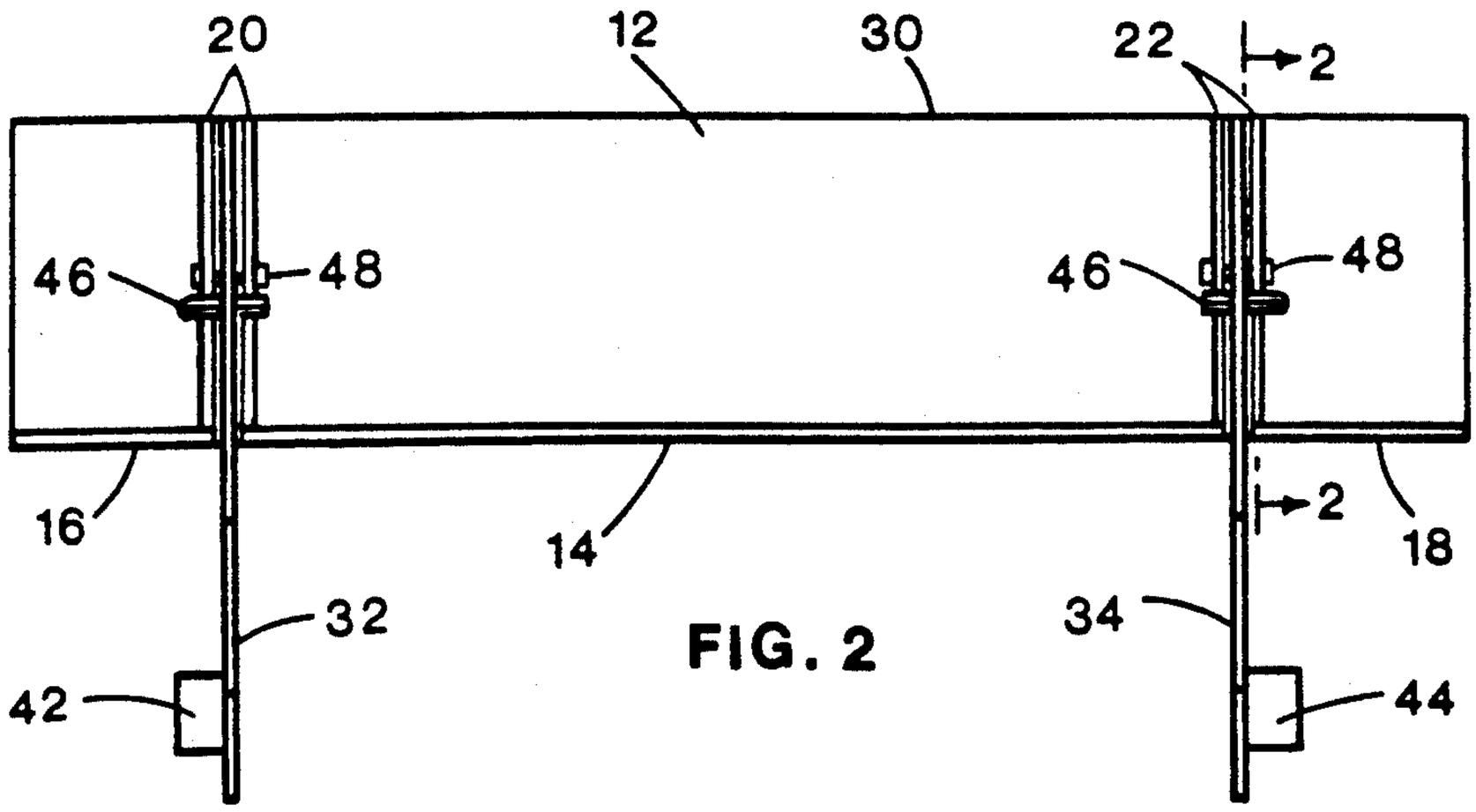


FIG. 2

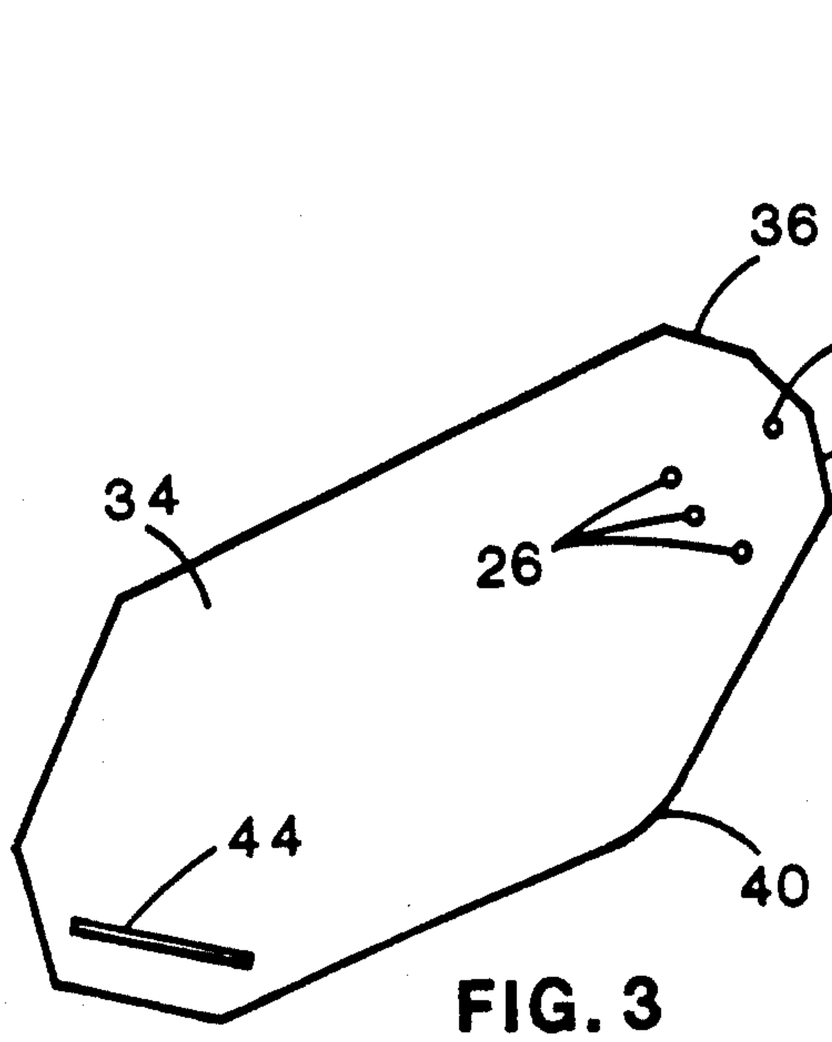


FIG. 3

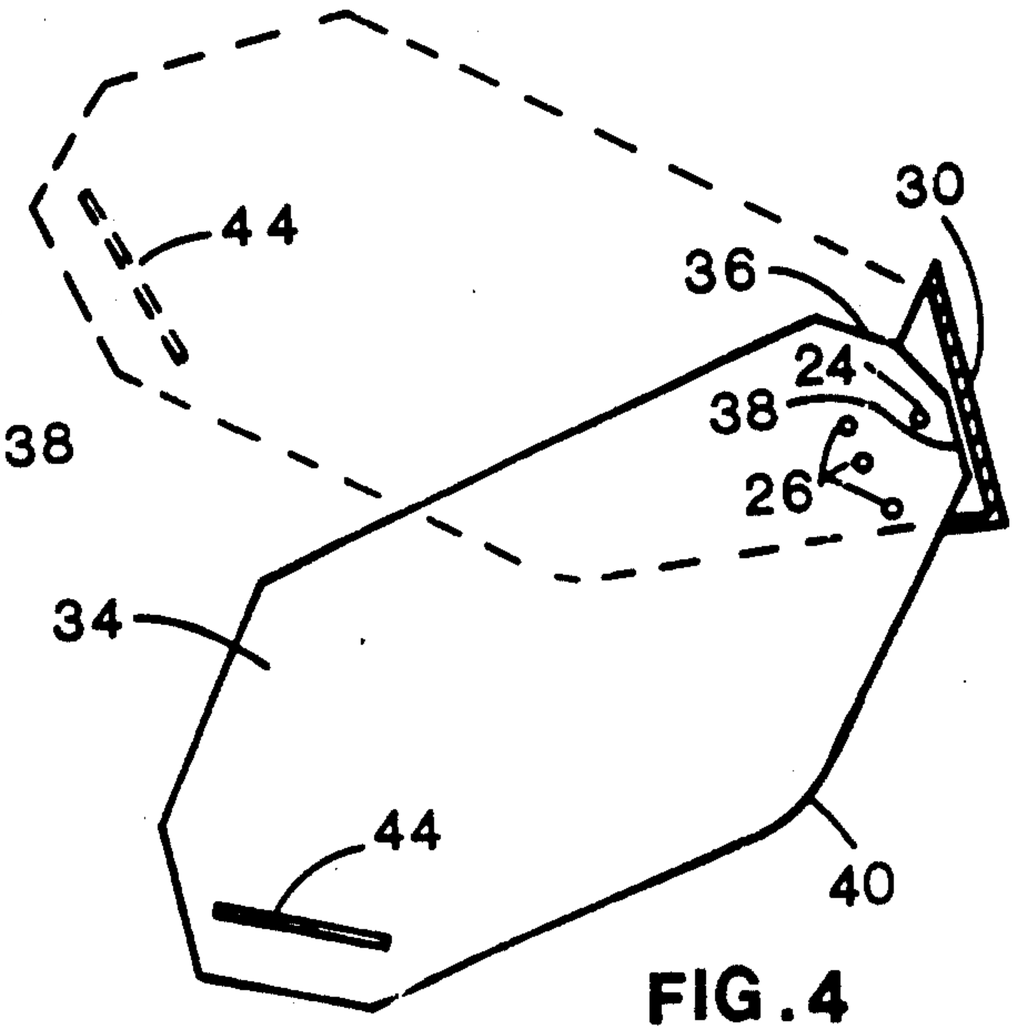


FIG. 4

ANTI-SKID DEVICE FOR FLAT-BOTTOMED BOATS

BACKGROUND—FIELD OF INVENTION

This invention relates to an anti-skid device for improving the steering capabilities of flat or nearly flat bottomed boats in general and in particular to outboard jet powered boats as they plane along the surface of the water.

BACKGROUND—DESCRIPTION OF PRIOR ART

There has long been a need to reduce side slippage of boats as they execute turning maneuvers while in a planing attitude. Although flat-bottomed boats equipped with conventional outboard engines do have a tendency to slide in turns, it is to a lesser extent and attention here will be focused on the outboard jet equipped boat.

Today's larger populations and their quest for outdoor recreation has led an ever increasing number of people to begin using outboard jet powered boats. These boats enable enthusiasts to travel in the more inaccessible and shallow portions of rivers, lakes, or other bodies of water. These bodies of water are often narrow and rock, or log filled, as well as shallow. Frequently boats are called upon to negotiate turns while planing along the surface in such places. Conventional outboard powered boats have less difficulty maneuvering because they have the engine's propped lower unit to act as a rudder and also to provide surface area to reduce side slippage in turns. However, because this lower unit depends well into the water below the boat's hull, it cannot operate safely in shallow or obstruction filled water.

Outboard jet powered boats can operate in very shallow water as little as 2–4 inches (5–10 cm.) over underwater objects such as rocks, logs, or the actual bottom of a body of water. This ability, however, is not without its limitations.

Necessarily the boat upon which an outboard jet is installed must have a flat, or nearly flat bottom to allow for this shallow running capability. Forward propulsion is created by the thrust of the jet race and straight line travel is accomplished with little difficulty but a problem arises when turning maneuvers must be executed. An outboard jet engine steers the boat by pivoting on it's axis; thus directing its jet race either to the left or to the right. Because flat bottomed boats have very little water displacement at planing speeds and there is no keel, rudder, skeg, or other device depending downward from either the boat hull or the engine to reduce lateral movement in turns, the natural elements of centrifugal force combine with the now sideward thrust of the maneuverable jet race to tend to force the boat hull to skid and steering control is reduced. Unfortunately, many boat operators lose control of their watercraft in such situations and often run aground or strike objects in their now misdirected path, causing property damage or personal injury.

Steering control problems of outboard jet powered boats have been addressed by prior art inventors. In U.S. Pat. No. 4,779,553 to Wildhaber on Oct. 2, 1987, an automatic rudder was employed but attention was focused on boats operated in reverse and at low or drifting forward boat speeds. In general, property damage or personal injury are of little concern in such situations. In

U.S. Pat. No. 4,437,841 to Stallman on Nov. 4, 1981, the steering control problems at higher planing speeds were addressed. A modified boat hull formed a channel to direct water into the outboard jet. This may have allowed the boat to maintain power in turns but lateral slide may still have been a problem because there is simply no underwater device employed to stop it.

The invention described herein is a transom mounted unit with a pair of pivotally attached, longitudinally parallel fins depending into the water below the boat hull. It provides resistance to the tendency of the boat hull to skid sideward when turning maneuvers are performed at higher, planing speeds.

The anti-skid device may be constructed of a rigid material such as sheet aluminum or steel. The base assembly component parts are assembled by welding or other suitable means and bolted or otherwise secured to the boat transom. The fins are constructed of the same rigid metal and are attached to the base assembly in a manner to provide for independent pivoting ability. The fins are housed in the base assembly in a gap between gussets which are integral to base construction and provide bilateral support for each fin, as well as pivotal connection. Incorporated in the design of each fin are features which control the limits of both upward and downward pivoting characteristics, and a convex leading edge which facilitates upward swing when objects are encountered. Additionally, each fin is supplied with a drag wing attached at an angle to urge the fin downward to counteract frictional upswing created by forward boat speed. When the boat is moving slowly or drifting, the fins fall by gravity and their own weight to their downward engaged positions and provide some resistance to lateral boat movement.

The object of this invention is to provide a device for reducing side slippage of flat-bottomed boats as they execute turns while planing along the surface of the water, thereby improving steering control.

It is another object of this invention to provide a device with pivotally attached fins depending below the boat hull that are independently and automatically retractable upon striking any underwater object or the actual bottom of a lake, river, or other body of water.

It is another object of this invention to provide a device with pivotally attached fins depending below the boat hull that are independently and instantly returned to their engaged positions once the object(s) are passed over.

It is another object of this invention to provide a device with fins containing elevational outline design features which limit upward and downward range of pivot.

In accordance with the immediately preceding object, it is another object to provide fins with convex leading edges to facilitate upward sweep when objects are encountered.

It is another object of this invention that by merely remaining in their downwardly engaged positions while the boat is not underway or is moving slowly, the fins provide some resistance to lateral movement when wind or current affect boat orientation.

It is another object of this invention to provide a device with pivotally attached fins that may be fixed in a non operative position whereby all effect on boat performance is nullified.

It is a final object of this invention to provide a device with pivotally attached fins that will improve steering

control of flat-bottomed boats, is completely automatic and simple in operation, may be constructed and assembled easily by conventional methods, of a low-cost material such as aluminum, is durable, trouble free, and requires no maintenance.

These and other objects and advantages of the invention will become apparent from the following description and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an isometric view of the anti-skid device of the present invention looking down from above and right of the stern toward the bow of the boat.

FIG. **2** is a diagram of the anti-skid device of the present invention taken from a rear elevational view.

FIG. **3** is a right side elevational view of the right side fin of the present invention.

FIG. **4** is a right side elevational view of the present invention taken in cross section along lines **2—2** of FIG. **2** showing the right side fin housed in the base assembly in its downwardly engaged limit of pivot and in dotted lines in its upward or disengaged limit of pivot.

DETAILED DESCRIPTION OF THE DRAWINGS

With reference to the drawings, in FIG. **1**, the numeral **10** is used to designate in general the stern or transom area of a boat. It is shown here to represent the general placement of the anti-skid device on the transom of a flat-bottomed boat, but it should be understood that the shape and type of boat hull **11** may vary and so accordingly will the general placement of the device.

The anti-skid device of this invention is indicated in general by the reference numeral **28** in FIG. **1**. It is comprised of three separate pieces: the left fin **32**, the right fin **34**, and the base assembly **30**. As seen in FIGS. **1** and **2** the base assembly **30**, which is constructed of rigid sheet aluminum components, consists of a transom plate **12**, a base plate **14**, a left corner base plate **16**, a right corner base plate **18**, a pair of left gussets **20**, and a pair of right gussets **22**. The rectangular transom plate **12** is joined at its bottom edge with the triangular base corner plates **16** and **18** at each end and the rectangular base plate **14** in the center. These are attached by welding to form an angle whereby the transom plate **12** lies flat on the boat transom **10** in FIG. **1**, and the base plates **14**, **16**, and **18** generally parallel the longitudinal bottom line of the boat hull **11**. Additionally, a gap is provided between corner base plate **16** and base plate **14** on the left side and base plate **14** and corner base plate **18** on the right side, as seen in FIG. **2**. The gaps are enclosed on each side by gussets **20** and **22** as best seen in FIG. **1**. The triangular gussets conform to the inside angle of the base assembly **30** and are welded in place providing the integral structure of the unit. The gussets **20** and **22** are spaced apart to provided a yoke for the pivotally attached fins, **32** and **34**. The fins are edge upstanding panels constructed of rigid sheet aluminum with a thickness of approximately $\frac{1}{8}$ inch and an elevational outline encompassing an area of substantially 85 square inches each. FIGS. **3** and **4** show the right side fin **34** in detail. A hole **24**, is provided in the fin allowing for pivotal attachment by means of bolt **48** FIG. **2**, installed in holes (not shown) in the base assembly **30**. The fin **34** in FIGS. **3** and **4** has edges **36** and **38** to provide for limits to the range of pivot and a convex leading edge **40**. In FIG. **2**, the fins **32** and **34** are provided with drag wings **42** and **44** which are perpendicularly attached by welding at a downward angle as seen in FIG. **3**, numeral **44**. Additionally, the fins **32** and **34** are provided with holes **26** as seen in FIGS. **3** and **4** of the right side fin **34**. A pin **46**, FIG. **2**, may be installed in holes **26** to disengage the fins from their operative positions.

In operation it will be understood that a flat-bottomed boat may be propelled along the surface of the water in a planing attitude by any one of a variety of propulsion methods (not shown) common to the art.

The anti-skid device **28** in FIG. **1** is installed medially on boat transom **10**, proximate the hull bottom **11**, when the boat is at rest or moving slowly, the pivotally attached fins **32** and **34** fall by their own weight and the action of gravity to their downwardly engaged positions. In this position the fins, with their surface area disposed substantially below the hull bottom, provide some degree of resistance to lateral boat movement. As boat speed is increased the fins are urged to remain downwardly engaged by the presence of the angularly attached drag wings **42** and **44** in FIG. **2**. The drag wings have a surface area of approximately 1.5 square inches and utilize water drag to overcome the tendency of the fins to be forced upward by friction with the water caused by forward boat speed. The boat performance is not noticeably affected by the minimal drag and as planing attitude is achieved, only the edge upstanding fins **32** and **34** remain in the water below the boat hull **11**. As turning maneuvers are executed, the resulting centrifugal force tends to cause a flat-bottomed boat to skid sideward. The downwardly engaged fins **32** and **34**, however, provide surface area sufficient to resist the lateral side, and steering control is improved.

When the boat is underway the downwardly engaged fins **32** and **34** depend below the boat hull **11** in FIG. **1**. Should contact with underwater objects or the bottom of a body of water occur, the fins are pivotally attached by bolts **48**, FIG. **2**, to allow for freedom of movement. If the boat is moving slowly and objects are encountered the fins easily swing free and then fall by their own weight and the action of gravity back to their engaged positions once the objects(s) are passed. If the boat is traveling at a speed sufficient to cause the fins to be downwardly engaged by the action of the drag wings **42** and **44**, the drag effect is overcome by the contact with an obstacle and the fins independently swing upward. Once the obstacle(s) are passed, the fins are instantly and independently returned to their downwardly engaged positions as the drag wings re-enter the water.

As best seen in FIG. **4**, incorporated in the fin design are features that control the upward and downward limits of pivot. The downward limit of travel of fin **34** around pivot point **24** is obtained when edge **38** meets with the transom plate of the base assembly **30**. When urged into this position by the drag wing **44**, the fin provides its most efficient resistance to lateral slide. The upward limit of travel of fin **34** around pivot point **24** occurs when edge **36** meets with the transom plate of the base assembly **30** as shown in phantom in FIG. **4**. This upward limit of pivot provides for protection against damage to the boat transom should upward travel of the fin have enough momentum to come into contact with an otherwise unprotected boat. Additionally, edge **40** FIG. **4**, which is the leading edge and will make first contact with any underwater obstacle, is convex to facilitate upswing of the fin around its pivot point.

Should the boat operator choose to disengage the anti-skid device **28** FIG. **1** from operation, holes **26** in FIG. **4** are provided. A pin **46** FIG. **2**, may be inserted into a selected hole and allowed to rest on gussets **20** and **22**, thereby preventing fins **32** and **34** from entering the water.

Although the foregoing contains specificities of construction and operation it is not desired to limit the invention thereto. Many changes and modifications will become apparent to one skilled in the art. Such changes and modifications are within the scope of this invention as defined in the appended claims.

I claim:

1. An anti-skid device for flat-bottomed boats comprising: a base assembly for attachment to a transom of a boat hull providing lateral support and means of pivotal attachment for a pair of rigid, longitudinally parallel, edge upstanding fin panels; said fin panels being disposed substantially below a bottom line of said boat hull; said fin panels attached to pivot independently about a horizontal axis through gaps provided in said base assembly; said gaps being enclosed on each side by means of a pair of gussets; said gussets being provided with holes to accept means for pivotal attachment of said fin panels; said gussets providing means of lateral support for the rigid fin panels therein pivotally confined; said fin panels being provided at a forward portion with edges that make contact with said base assembly providing means for limiting the downward, water-engaging range of pivot; said fin panels being provided at a forward portion with edges that make contact with said base assembly providing means for limiting upward or disengaged range of pivot; said fin panels being provided with a drag wing attached substantially perpendicular to and at a downward angle for means of utilizing water drag to effect downward water-engaging positions; said drag wings having surface area sufficient to ensure downward engagement of said fin panels against frictional upswing created by forward boat speed; said drag wings having surface area sufficient to allow said fin panels to easily swing free around said pivot point as obstacles are encountered; said fin panels having a convex leading edge facilitating upswing around said pivot point when underwater obstacles are struck; whereby said pivotal fin panels provide means for resisting lateral slide of said boat when in their downward, water-engaging positions.

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